

INTRODUCTION

Chemicals are certainly useful, on the job and off. But as we all know, many chemicals are hazardous to your health if you are exposed to them unknowingly or without taking the necessary precautions.

This safety training program is broken into two sections. The first section will provide you with information on hazardous chemicals and with procedures and equipment that will reduce your chance of exposure. To ensure that everyone gets this kind of information and protection, and to provide a uniform way of delivering it, OSHA has developed the Hazard Communication Standard. The basic goal of the standard is that you have a right to know about the hazards you face in the workplace and how to protect yourself from these hazards.

The second section of the training program deals with general laboratory safety. This section includes general chemical safety information, including the proper storage, handling, and disposal of laboratory chemicals in the workplace.

TRAINING OBJECTIVES

After completing this training, the attendee will be able to:

SECTION ONE- RIGHT TO KNOW/ HAZCOM

- Explain the OSHA Hazard Communication Standard
- Explain the Florida Toxic Substances in the Workplace Law
- Explain the elements of the NHMFL Safety Procedure 20, Hazard Communication
- Review of Hazard Evaluation
- Identify how to read and understand product labels
- Identify how to read and understand MSDS
- Identify the chemical inventory process
- Identify chemical procurement, shipping, and receiving

SECTION TWO- LAB SAFETY AND HAZARDOUS WASTE REQUIREMENTS

- Identify general chemical safety guidelines
- Understand detection and prevention of chemical hazards
- Hazard awareness evaluation
- Safely store and handle hazardous materials
- Be familiar with emergency procedures
- Understand hazardous waste requirements

NOTES

OSHA is the Occupational Safety and Health Administration. Its purpose is to ensure safety in the workplace.

MSDS are Material Safety Data Sheets. They provide information on the hazards of the material.

- ## NOTES

- Know of toxic substances present in the workplace
- Obtain copies of MSDS
- Refuse to work under circumstances where not adequately trained
- Receive training on toxic substances including identification, safe work practices, first aid treatment, health effects of exposures, and emergency response
- Enjoy a workplace free from recognized hazards

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**NHMFL SAFETY
PROCEDURE 20,
HAZARD
COMMUNICATION**

The NHMFL has adopted a written safety procedure, titled **Hazard Communication**, to be followed by all employees, users, visitors, and contractors entering the facility to perform work. The safety procedure contains the following information:

- Explains the Chemical Inventory List
- Lists the methods to inform personnel of workplace hazards
- Explains the labeling system at the NHMFL
- Identifies the MSDS system
- Identifies training requirements for all personnel

This procedure is available from the Safety Office, your area coordinator, or can be viewed electronically via the NHMFL File Server.

HAZARD EVALUATION

The OSHA HCS requires all chemical manufacturers to evaluate their products and determine if there is any significant health or safety hazards related to the use of the products. Chemical manufacturers are required to develop MSDS for all materials they produce and to supply them to vendors upon request.

All containers of hazardous substances must be labeled in English and provide at a minimum the following information:

- chemical name
- list of ingredients if the material is a mixture or solution
- appropriate hazard warning labels
- manufacturer's name and address

These labels must be maintained at all times and be clearly displayed. Other labels, such as the U.S. Department of Transportation hazard labels, may also appear on the container and should not be removed.

MATERIAL SAFETY DATA SHEETS

MSDS are provided for each hazardous chemical in the workplace. They provide specific information on the hazards of the material and how to safely store, handle, transport, and dispose of the material.

NOTES

CHEMICAL PROCUREMENT, SHIPPING AND RECEIVING

NOTES

The NHMFL Shipping and Receiving Office is located in the OPMD Building in room OP-129. The phone number is 644-0627.

NOTES

SECTION TWO

GENERAL CHEMICAL SAFETY

Chemical safety depends on control and knowledge of hazardous materials and basic chemical properties. The most potentially dangerous materials are shipped, stored, handled, used and disposed of every day by trained personnel. All of these personnel are aware of the hazards involved with these operations and how to control the hazards. The following are general safety rules that are followed by safe personnel:

- All containers are labeled clearly and completely
- Chemicals are stored by the hazards they possess
- Eating, drinking, and smoking is not allowed in areas where hazardous

materials are stored or used

- Read and understand warning labels and signs
- Safely transport, pour, and handle liquid and solid materials
- Use personal protective equipment as necessary
- Use fume hoods when handling materials
- Read MSDS for safety information before using a material
- Clean up and report spills promptly
- Use caution when mixing chemicals

- Chemical states and forms include:

- Possible routes of entry into the body:

Injection- puncture

- Chemical exposure

- Key terms

NOTES

Sodium cyanide is an acutely toxic material.

Chronic: Exposure symptoms are usually delayed or cumulative, and result from repeated exposure to low levels of a hazardous substance over a prolonged period of time.

- Permissible Exposure Limits (PEL):** An exposure limit set by OSHA which employees can be exposed to without any adverse health effects or other precaution during a normal working day. These values are enforced as legal standards by OSHA.

- Control of chemical exposures

- Elimination of hazardous materials from the work site
- Substituting for less hazardous materials
- Isolation from the hazardous substance
- Ventilation
- Personal protective equipment
- Proper waste disposal
- Medical monitoring
- Training and education

CHEMICAL STORAGE

Proper chemical storage is critical in creating a safe workplace. Follow these basic guidelines:

- Store flammable and corrosive materials in approved safety cabinets or in a dedicated area
- Store highly toxic, radioactive, or controlled substances in a secure, lockable area
- Do not store chemicals in the fume hoods
- Do not keep chemicals longer than the indicated shelf life
- Dispose of peroxide forming chemicals before the expiration date on the container
- Oxidizing materials should be stored separately from flammable and corrosive materials
- Store compressed gas cylinders in designated storage areas
- Avoid storing chemicals on the floor or in high locations
- Keep all containers securely closed

HAZARD AWARENESS

Hazard awareness is recognizing and understanding the characteristics of a hazardous material and knowing how to protect yourself from those hazards. Hazard awareness can be improved by following these steps:

- Read and understand labels, signs and other warning information

NOTES

Ethers and **tetrahydrofurans** are examples of chemicals which can form explosive peroxides upon prolonged storage.

A hazardous material is any chemical that has any health, physical, or safety properties.

- ## STORING AND HANDLING HAZARDOUS MATERIALS

- Radioactive materials (Thorium, uranium oxide)
- Flammable and non-flammable gases (Argon, nitrogen)
- Flammable liquids and solids (Methanol, sodium metal)
- Oxidizers and organic peroxides (Sodium chlorate, benzoyl peroxide)
- Poisonous liquids and solids (Methylene chloride, phenol)

- Flammable materials should be stored in an approved flammable materials cabinet. Keep all sources of ignition away from flammable materials.
- Store acids separate from other hazardous materials
- Never put acids in steel/metal containers
- Liquids should be stored using secondary containment devices
- Never store hazardous materials in the floor or higher than eye level
- Inspect containers for leaks or cracks
- Discard old, unwanted, damaged containers by contacting the Safety Office
- Don't store chemicals in the fume hoods

A spill, leak, release, fire, uncontrolled reaction, explosion, or accidental contact with a hazardous material requires immediate action to prevent injury or property damage. Report any such emergency to the Safety Office immediately.

Kyle Orth
644-0233 office
657-8278 pager

Todd Wegenast
644-6955 office
657-8279 pager

- **Check** the scene for safety and then check the victim
- **Call** the NHMFL Safety Office, the FSU Police at 4-1234, or call 9-911 for emergency assistance
- **Care** for the victims or the scene if qualified

- Evacuate the area and keep unauthorized persons out
- Refer to the MSDS or container label for safety precautions
- Contain the spill if possible, use absorbent materials
- Eliminate sources of ignition if flammable material
- If there is a fire, activate the building alarm system
- Stay on the scene, if safe, until emergency personnel arrive
- Care for victims and provide first aid if trained
- For skin or eye contact, immediately flush the materials with large amounts of water

Emergency equipment should include fire extinguishers, safety showers and eyewashes, first aid kits, spill kits, alarms and phones.

SPILL CONTROL PROCEDURES

All areas where hazardous substances or wastes are generated or stored shall have spill control procedures in place to deal with minor spills. Spill kits shall be readily available in these areas. Minor spills, less than one pint of liquid or one pound of solid material, involving non-acutely toxic substances may be cleaned up by the personnel working in the area provided they have been trained and have the proper PPE on hand.

If a minor spill occurs, follow these procedures:

- Secure the area, notify other workers in the area
- Keep unauthorized personnel out of the spill area
- Identify the material and the hazards
- Consult the MSDS and container label
- Use the proper PPE
- Absorb and containerize the material
- Label the container with the contents and the words "**Hazardous Waste**"
- Contact the NHMFL Safety Office for pick up of the waste

For larger spills, spills of highly toxic substances, or for assistance contact the Safety Office. Also, refer to the NHMFL Safety Procedure, **SP-3 Emergency Action Plan** for more details.

NOTES

The NHMFL Safety Office has placed spill kits in many labs and work areas throughout the facility. If your work area needs a spill kit, contact the Safety Office.

The Safety Office provides training on hazardous materials spill response.

A waste is considered hazardous if it has any of the following characteristics:

- **Ignitability**- having a flash point <140°F/60°C
Example: Acetone, methanol
- **Corrosivity**- having a pH <2.0 or >12.5
Example: Nitric acid, sodium hydroxide
- **Toxicity**- based on the Toxicity Characteristic Leaching Procedure or TCLP
Example: Barium and Mercury containing materials
- **Reactivity**- air, water, or other reactive materials
Example: Sodium metal or cyanides

The NHMFL is classified as a conditionally exempt small quantity generator by the **Florida Department of Environmental Protection (DEP)**. This means that our entire facility generates or produces less than 100 kilograms of hazardous waste in one calendar month. The waste materials are picked up by a licensed and permitted hazardous waste transportation and disposal company on a quarterly basis or as needed.

CONTAINER MANAGEMENT

All hazardous waste accumulation points are required to follow proper container management practices. There are signs posted throughout the facility of the hazardous waste generation and accumulation requirements. These include using the safety containers provided for storing hazardous wastes. One gallon steel safety cans are provided for storing non-halogenated solvents (acetone, toluene, methanol) and one gallon polyethylene safety cans are provided for storing acid waste solutions. Labels attached to the cans are provided for marking the contents of the waste solutions. When a solution is added to the container, indicate the contents on the label. Contact the Safety Office when the containers are full or to arrange a pick up.

NOTES

D001 is the waste code for ignitability.

D002 is the waste code for corrosivity.

D004-D011 are regulated toxic metals. These include arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver.

D003 is the waste code for reactivity.

Many pesticides are regulated and carry characteristic waste codes.

Halogens are chlorine, fluorine, bromine and iodine. Solvents containing these are considered **halogenated**.

Each lab, work area or accumulation area should have assigned someone who is responsible for the storage and accumulation of hazardous wastes. This person will oversee the collection and disposal of these wastes by contacting the Safety Office.

NOTES

The Resource Conservation and Recovery Act, or **RCRA**, passed by Congress in 1976 established the hazardous waste regulations. These laws established the "cradle-to-grave" tracking system for hazardous waste.

- Use safety containers for liquid wastes
- Use containers that are compatible with the wastes
- Label all containers with "**Hazardous Waste**"
- Label all containers with the contents and date filled
- Keep all waste containers closed securely
- Store incompatible wastes separate
- Check the condition of the containers for signs of leaks
- Use the proper PPE when handling and filling waste containers
- Don't dispose of wastes in the drains or in the trash
- Never mix radioactive wastes with other types of wastes
- Use secondary containment for storing waste containers

COLLECTION OF HAZARDOUS WASTES

Contact the NHMFL Safety Office to arrange for the pick-up of hazardous wastes or to arrange a laboratory clean out. The Safety Office can provide waste containers and assistance in starting an accumulation area. Check your work areas monthly for old, outdated, spent solutions, or other waste materials and contact the Safety Office for a pick-up. If you have any questions, ask.

**CONTAINER
MANAGEMENT
PRACTICES**

SUMMARY

As you can tell, the Hazard Communication Standard is a very significant regulation for anyone who works with, or has the potential for contact with, hazardous chemicals in the workplace. The standard ensures that every chemical we get comes with information on its potential hazards, via the MSDS system. Even more important the standard gives you, as an employee, the right to know about hazardous chemicals in the workplace and how to protect yourself from these hazards. From the information in this training program and your increased knowledge and awareness, the NHMFL will remain a safe work environment for all personnel.

APPENDIX A

LABORATORY SAFETY CHECKLIST

Follow principals of lab safety

- ☐ Minimize all chemical exposures
- ☐ Never underestimate risk
- ☐ Use adequate ventilation
- ☐ Take exposure limits seriously

Be familiar with

- ☐ OSHA Hazard Communication Standard
- ☐ NHMFL Safety Procedure
- ☐ Chemical container labels
- ☐ Material Safety Data Sheets
- ☐ Exposure limits
- ☐ Chemical physical and health hazards
- ☐ Emergency procedures

Use required ventilation and protective equipment

- ☐ Be sure the fume hood is operating properly
- ☐ Don't store chemicals or supplies in the fume hoods or block vents
- ☐ Keep hood closed when not in use
- ☐ Wear the appropriate personal protective equipment

Store, handle and dispose of chemicals safely

- ☐ Keep inventories limited to what is needed
- ☐ Keep inventory lists up to date
- ☐ Be sure the containers are labeled
- ☐ Use secondary containment for liquids
- ☐ Avoid storing chemicals near heat, sunlight, or incompatibles
- ☐ Keep materials properly segregated
- ☐ Check condition of containers frequently
- ☐ Carry chemical containers in a chemical bucket when transporting

- ___ Dispose of wastes promptly and properly
- ___ Never pour chemical wastes down the drain or place in the trash

Practice good hygiene

- ___ Don't eat, drink, smoke or chew gum in areas with hazardous lab chemicals
- ___ Wash hands before and after leaving the lab area
- ___ Don't store food items in laboratory refrigerators
- ___ Do not use mouth suction to start a pipette or siphon
- ___ Don't smell or taste chemicals

Practice good housekeeping

- ___ Keep work area neat
- ___ Never store or place materials in halls, aisles or exits
- ___ Don't block emergency equipment
- ___ If an experiment must be left unattended, leave warning lights or sign in place to warn others of the hazards

Prevent fires and other lab hazards

- ___ Use tongs and heat resistant gloves with equipment that uses heat
- ___ Don't touch electrical equipment with wet hands and use ground plugs
- ___ Inspect electrical wires and plugs before use
- ___ Keep clothing or long hair away from moving parts and machinery
- ___ Keep compressed gas cylinders secure
- ___ Operate equipment that you have been trained on
- ___ Report any equipment that is not working properly

Act promptly and properly in an emergency

- ___ Clean up small spills and report them to the Safety Office
- ___ Contact the Safety Office for large spills
- ___ Know emergency evacuation procedures
- ___ For chemical inhalation, get to fresh air and call for help
- ___ For chemical ingestion, check the MSDS and call for help
- ___ For eye contact, wash immediately with large amounts of water
- ___ For skin contact, immediately flush the area with water

Use common sense

- ☐ Be alert to any unsafe conditions and report them to the Safety Office
- ☐ Never indulge in horseplay
- ☐ Know the hazards of the material before you begin work